Regional Program on Enterprise Development

Rped

Discussion Papers

Organizational Ecology and Growth of Firms in Developing Countries

Evidence from Cote d'Ivoire

by
Leo Sleuwaegen and Micheline Goedhuys

September 1997

RPED paper No.90

Organisational ecology and growth of firms in developing countries Evidence from Côte d'Ivoire

Leo Sleuwaegen[1]

Micheline Goedhuys[2]

Abstract

The bimodal size structure of manufacturing firms in African countries is found to result from a complex process in which institutional and structural factors interact with a dynamic learning growth process of firms. Using a unique data set on the growth of firms in the manufacturing sector of Côte d'Ivoire, firm growth is explained by size and age effects as a result of efficiency seeking through scale enlargements and learning, but is strongly moderated by processes of diffuse competition through which firms compete for resources and by formal legitimation in the industry. These processes appear to substitute for the lack of well developed markets. Complementing the model with data on the obstacles to growth as they are perceived by the managers or owners of the firms, medium sized firms are found to be 'caught in the middle' and are strongly hurt by insufficient access to good infrastructural and financial services.

Keywords: selection, firm growth, organisational ecology
JEL Codes: D92, L11, O17, O55

September, 1997

The authors would like to thank the participants of the conference 'The Impact of Technological Change on Industry and Firm Performance' held in August, 1997 in Rotterdam and in particular we are grateful to David Audretsch, Martin Carree and Steven Klepper. Financial support from the Belgian Fund for Scientific Research (FWO-G.0196.96 N) is gratefully acknowledged.

---

[1] Catholic University of Leuven ;Department of Applied Economics
Naamsestraat 69, B-3000 Leuven, Belgium
Telephone: (32) 16.32.69.13; Facsimile: (32) 16.32.67.32;Email: Leo.Sleuwaegen@econ.kuleuven.ac.be

[2] Catholic University of Leuven ; Center for Economic Studies, Department of Economics
Naamsestraat 69, B-3000 Leuven, Belgium
Telephone: (32) 16.32.69.16; Facsimile: (32) 16.32.67.96; Email: Micheline.Goedhuys@econ.kuleuven.ac.be

1. Introduction

In many African countries, even in countries with a comparatively large manufacturing sector, the size structure of firms is highly dualistic. The largest share of industrial output is produced in large-scale modern establishments with a more advanced capital intensive technology, which is mostly imported and import-dependent. On the other hand, most employment in manufacturing takes place in the informal sector which provides basic manufactured goods for local customers using very simple labour-intensive techniques. Despite the dynamism of micro-enterprises and small firms to survive and to operate in a very competitive environment, they have insufficiently evolved into more productive formal activity firms and have seldomly graduated into larger-scale operations. African entrepreneurship remains extremely weak in medium and large-scale modern industry. This feature of the African industrial sector is commonly referred to as the 'missing middle' in the size distribution of firms (Biggs and Oppenheim, 1996). It deviates from the observed size distributions of firms in Western economies.

This paper focuses on the industrial structure and growth of manufacturing firms in Côte d'Ivoire. Côte d'Ivoire is an interesting country for the study of enterprise development. It has by African standards a relatively well developed industrial sector, accounting for approximately 20% of GDP over the period 1980-93 (World Bank, 1994, p.62). It can also be considered as a good representative country for the region as it shares its past economic achievements and its current structural problems with a large number of Sub Saharan African countries. In the first decades after independence the economic and industrial development of the country was impressive. The country entered a period of severe economic crisis by the end of the 1970s and was one of the first countries to implement Structural Adjustment Programs (SAPs) as early as 1981.

The country's manufacturing sector was shaped in the early post-independence period, when the development of a solid and modern industrial base was expected to come from large-scale investments by the state and foreign investors. The large-scale enterprises generated disappointing results and in the beginning of the 1980s the focus of attention was shifted towards smaller scale enterprises as the engine of growth. The SAPs implemented since then aimed at macro-economic stabilisation and 'restoring market forces', channelling resources into more productive sectors and removing the discriminatory measures which hamper the development of small firms. Whether the SAPs succeeded in realising their objectives is at least doubtful. After more than 10 years structural adjustment the industrial structure is still described as being characterised by 'a "missing middle" of dynamic small- and medium-scale firms' (World Bank, 1994, p.5). Data from the 'Banque de Données Financières'[3] show that there is indeed a relative overrepresentation of firms in the largest and in the smallest size categories.

---

[3] All firms in the manufacturing sector that follow the French accounting system are required to file their balance sheets with the Banque de Données Financières (BDF). Coverage of the manufacturing sector is extensive but not complete, especially for the smaller firm categories. Despite these deficiencies the BDF represents the most complete list of formally registered establishments. As firms submit their balance sheets with an average delay of four years the data of 1987 were used to describe the size distribution of manufacturing firms. Data on production in 1987 were available for 522 manufacturing firms. A Shapiro-Wilk test was done to test the hypothesis that the size of firms is log-normally distributed. The null-hypothesis could be rejected at the 95% confidence level as firms in the largest and smallest size categories

In spite of its achievements, Côte d'Ivoire can still be characterised as an economy where markets are relatively underdeveloped and transaction costs extremely high. The existing theories on firm growth do not sufficiently take these features into account. The purpose of this paper is to provide a more comprehensive integrated approach and to test this approach against data on the growth of firms in the manufacturing sector of the country. This new framework may also help to shed additional light on recent empirical findings with respect to the growth of small firms in southern African countries (McPherson, 1996) and in India (Das 1995).

The paper is organised as follows. The second section reviews the existing literature on firm size and growth with respect to its relevance in developing countries. The third section introduces elements from the organisational ecology literature and shows how they can complement the existing literature on firm size and growth in a context of less developed market institutions. Section four presents an integrated approach which serves as a basis for empirical testing. After presenting the data in section five the empirical model is proposed in section six and tested against data on manufacturing firms in Cote d'Ivoire. Corroborating insights on the obstacles to firm development are derived from analysing the owner's and manager's perception in section seven. Section eight concludes.

2. The growth of firms

Research on the size distributions of firms and the underlying firm dynamics commonly starts from Gibrat's law of proportionate effect (LPE). According to this law firms grow each year following a random drawing from a distribution of growth rates. As a consequence the expected value of the increment of a firm's size in each period is proportional to the current size of the firm. This stochastic growth model as well as the whole generation of growth models based on weaker assumptions of the LPE generate skewed distributions (log-normal, Pareto, Yule) which fit the observed size distributions of firms in Western economies strikingly well (Ijiri, Simon, 1964). In spite of the apparent power of Gibrat's law, an increasing number of empirical studies find evidence which goes against it. Most studies find a significant negative relationship between firm growth and firm size (Mansfield (1962), Evans (1987a), Kumar (1985) and Dunne and Hughes (1994)) and between the variability in growth rates and firm size [Mansfield (1962), Kumar (1985), Dunne and Hughes (1994), Dunne, Roberts and Samuelson (1989)]. Similarly Gibrat's law is violated by a negative relationship between firm growth and firm age [Evans (1987a) and Dunne and Hughes (1994)] and between the variability in growth and firm age.

Using an alternative theoretical approach Lucas (1978) argued that the equilibrium size distribution of firms is determined by the underlying distribution of managerial abilities within the population. Deepening this line of reasoning, Jovanovic (1982) claimed that, once firms are established in the industry, they learn about their efficiency. The process of

---

were relatively overrepresented. Taking into account that smaller firms were less completely represented, it can be assumed that the actual bimodal shape is even more pronounced.

competition forces the least efficient firms to exit. The more efficient firms expand their activities when their managers observe that their guesses about their managerial efficiency turn out to have understated their true efficiency. As a firm ages, the manager's guess about his efficiency becomes more accurate and the probability decreases that the output will widely differ from one year to another. Older firms therefore grow more slowly than young firms and their growth rates are relatively stable. Pakes and Ericson (1990) extended the passive learning model of Jovanovic. In their view managers not only uncover their (fixed) level of efficiency through learning, they are also able to increase this level of efficiency over time through human capital formation.

Unfortunately, neither the stochastic models nor the recently developed learning models which violate the LPE, provide a sufficient explanation for the emergence of the dual market structure observed in many LDCs. If smaller firms are found to grow significantly faster than larger firms, a bimodal shape disappears automatically as successful small firms move up to the middle of the size distribution. Models of learning assume that competition among firms in an industry selects the more efficient firms into the industry and forces inefficient firms to exit. However, competition fails to operate as a selection mechanism if a too low number of market participants and the existence of transaction costs hamper the well functioning of markets. This appears to happen in many African economies where factor markets are ill-developed and some groups of firms face serious constraints in their access to inputs such as credit, skilled labour, utilities, business licenses, support services etc.

Institutional economists have drawn attention to the importance of institutional influences, the degree of development of markets and the existence of transaction costs for explaining market structure in developing countries. Nabli and Nugent (1989) argue that due to the existence of transaction and information costs the actual size distribution of firms can deviate from the 'natural' distribution which would emerge from exogenous factors like technology, market size, transport costs. Under extreme conditions the 'transaction cost considerations might be such as to lead some otherwise average-sized establishments to become large and others to become small, leading to the frequently observed dualistic structure characterised by a bimodal distribution'. The argument is mainly developed around the effect of the relative underdevelopment of markets for credit and equity on the size of firms (Nabli, Nugent, 1992, see also Nugent (1996) for an empirical testing with respect to Korea).

The basic idea of institutional economics should therefore be extended and generalised in the context of firm development, centering on the following question: If markets are underdeveloped and competition as a selection mechanism is deficient, which processes are operating instead to select firms and to allow them to grow. In order to address this question it appears useful to borrow some core insights from the organisational ecology literature. Organisational ecology typically puts heavy weight on the institutional environment in explaining observed populations of organisations (Boone and van Witteloostuijn, 1994). The importance of organisational ecology is explicitly recognised in the work of Klepper and Graddy (1990) and especially appropriate in the context of developing countries.

3. Ecological and evolutionary models with institutional constraints

Organisational ecology (OE) is primarily inspired by analogies from biological population ecology. One of the purposes of the organisational ecology literature is to explain why there are so many different kinds of organisations. Like biological diversity, the diversity of organisations is explained by selection within a Darwinian perspective. Organisations of different kinds exist because the environment allows certain forms of organisations to exist. A changing environment selects new forms of organisations, and changes in the population of organisations are mainly due to the founding and mortality of organisations. Due to the existence of *relative inertia* in organisations, OE recognises that there are limits to the speed and scope of adjustment of organisations to changes in the environment. This is in contrast to much of the traditional management strategy literature which states that firms continuously fine-tune their structure and strategy to a changing environment. While *adaptation* of organisations is central to management literature, *selection* (entry and exit) is the key to change in an organisational population according to the OE literature. Another distinction between both strands in literature is that the prime level of analysis is the individual organisation in IO literature while the focus is on a population of organisations in OE (Boone, van Witteloostuijn, 1994).

The (development of the) number of firms depends on several factors. In the OE view the niche in which the population resides is crucial. The *fundamental niche* of a population of organisations consists of the set of all environmental (social, economic, political) conditions in which the population can grow or at least sustain its numbers. If two organisational populations rely on completely different kinds of resources and depend on different kinds of social and political institutions, their fundamental niches do not intersect. Intersection in fundamental niches might be thought of as potential competition. Two populations compete if and only if their fundamental niches intersect. Competition is centred around resources, as opposed to the traditional concept of competition in the product market.
When two or more populations with intersecting fundamental niches occupy the same system, the expansion of one population changes the conditions of the other's existence. The term *realised niche* is therefore used to refer to the restricted environmental space in which a population can sustain itself in the presence of competing populations (Hannan, Carroll, 1992). Within a population all organisations compete for the same set of resources, a process called *'diffuse competition'*. The growth of any one organisation impedes the growth of others (Hannan, Ranger-Moore, Banaszak-Holl, 1990).

The niche concept shows some similarities to the strategic group concept described in management literature. Niches can be described following several dimensions, mostly location and size (Debackere, Clarysse, 1997). Some organisational ecologists have used the spatial dimension to identify niches, indicating that location matters with respect to founding and mortality rates. Another theoretical explanation focuses on different niches based on size of firms. Organisations compete most heavily with organisations of a comparable size (Hannan, Ranger-Moore, Banaszak-Holl, 1990). Organisations of different sizes, although they are engaged in similar activities, use different strategies, structures and resources and serve different clients. This also implies that organisations in the middle of the size distribution compete most intensely as they compete for resources both with large and small organisations (Boone, van Witteloostuijn, 1994).

An important feature of a niche is its carrying capacity, that is, its maximum size or the maximum number of organisations that can sustain itself in that niche. The degree to which the carrying capacity of the niche is filled is called 'density'. Density is measured by the number of organisations in the niche. Density is determined by two forces: competition and legitimation. Intense competition within a population depresses founding rates in that niche. As the level of competition increases, more of the resources needed to build and sustain organisations have already been claimed by other organisations. Intense competition causes supplies of resources to become exhausted. Fewer resources go unclaimed and markets are packed tightly. In tightly packed niches, new entrants are pushed to the margins of the resource distribution. Even if they succeed in successfully exploiting the inferior regions of the resource space, in the course of doing so they commit themselves in persisting at the margins. Learning of the staff, the experience of the entire organisation, and the connections of the organisation with the environment all become specialised to exploiting the inferior regions of the environment. Attempting to shift towards the centre of the resource space will bring the organisation into competition with others experienced in exploiting the centre. Marginal organisations will therefore have higher than average mortality rates (Hannan, Carroll, 1992).

Density moreover varies systematically with legitimation or institutionalisation. Legitimation is primarily a sociological concept. Legitimation refers to the social acceptance of an organisational form. An organisational form is institutionalised or legitimated to the extent that it has a taken-for-granted character, which provides it with an institutional standing in the eyes of the law enforcing agencies, consumers, suppliers, police, and other key actors. A form receives legitimation to the extent that its structure and routines follow the dictates of the prevailing institutional rules. Legitimation is stronger than competition at very low densities (Hannan, Carroll, 1992). This is in economic terms, in new or thin markets.

Despite the fact that the concepts of competition and legitimation are developed to explain density variations through entry and exits of organisations, much of their meaning remains relevant in the context of firm growth. The process of competition for inputs and the importance of the process of legimitation in thin markets can be extended to the theory of firm growth. The focus here is however on the individual firm and on its interaction with the environment. Organisational change, growth or contraction, is viewed as determined by environmental conditions. This view is shared with the evolutionary theory which, in a more adaptive approach, state that the entrepreneur engages in innovation or imitation when the environment in which the firm operates, its boundaries, culture, know how, rules and incentives structure, make the performance of the firm unacceptable.

4. Towards an integrated approach

There is little doubt that the market selection processes and associated growth theories developed within a dynamic learning context (Jovanovic,1982, Pakes and Ericson, 1990) are also at work in developing countries. However, the speed and efficiency at which they work appears to be moderated through the particular, less developed, institutional and

economic context in which firms have to operate. The absence of well developed institutions, including factor and services markets, may therefore render legitimation and diffuse competition, from the population ecology perspective, important moderators in explaining growth performance of firms. Clearly, the moderating effects are likely to differ across regions, sectors, and even segments within industries. For some industrial sectors markets and regulations may be better developed. Because of an underdeveloped transport and communication infrastructure, the difference in institutional and economic context is also likely to be great across different regions of the same country.

If efficient supporting institutions are ill developed, information asymmetries arise and privileged relationships emerge following the logic of the legitimation process. The incorporation of legitimation as a growth determining factor appears particularly appropriate to the analysis of firm growth in developing countries. The most frequently mentioned institutional barriers to the growth of firms in developing countries are the relative underdevelopment of markets for credit, equity capital, management and skilled labour, the lack of access to industrial sites with suitable infrastructural facilities, regulatory constraints, the various kinds of taxes, price regimes, risk, protection from imports and state subsidies, the lack of physical inputs, materials and spare parts and so forth. In a developing country, especially in Sub-Sahara Africa, the process of legitimation has therefore been very important. After independence a new 'modern' industrial sector was created by the state and foreign investors, which was superimposed to the 'traditional' domestic and private small scale activities. This new form of organisations was politically stimulated, and most of the resources were channelled into this group of organisations. Belonging to this group required that the organisation had a formal status, fulfilling all legal regulations on activities, labour and location as well as all fiscal obligations which characterised the new modern economy and distinguished the firm from the traditional activities. This formal status granted the firm legitimation in the new business environment and gave it the possibility to advertise itself and to develop privileged relationships with suppliers, clients and other parties.

Confronted with the process of legitimation and diffuse competition, newly created firms may adopt different technologies or serve particular market segments, giving rise to localised competition, with important differences in growth potential following the niche in which the operate. The diffuse competition for resources offers greater growth potential to legitimised firms using modern production techniques which can easily be stretched into more specialised niches. As a consequence, the realised niche of other firms is strongly reduced and they are forced to operate in the marginal edge of the resource space. Those firms are often denied access to capital, foreign exchange, assistance and import licenses. They are forced to operate with relatively abundant factors and, consequently will specialise in labour intensive production techniques. Within the niches the more efficient firms can grow up to a level at which they start facing competition from firms of a larger realised niche with a distinct technology. The latter firms have a competitive advantage over the newly growing firms in that segment of the market. A firm's transition to a wider niche, i.e. the shift to a more conductive resource space, assumes, however, formal legitimation. As such, with a formal status a firm can signal to the business environment that it is a serious contractor and is accepting the rules of the modern sector. The formal status can thus be expected to open up a firm's growth opportunities.

It is the contention of this paper that the combination of market selection through learning with diffuse competition and legitimation as growth moderators may account for the observed bi- or multi-modal size distribution of firms in less developed countries. In examining the growth determinants of firms in the manufacturing sector of Cote d'Ivoire the proposed framework will therefore be tested against data on a heterogeneous group of firms, composed of firms of different starting size, age, formal status, technology and based in different regions of the country.

5. Data

The empirical analysis uses a unique data set covering the growth of a representative sample of Ivorian manufacturing firms. The data are obtained from a survey conducted in 1995 and 1996 in the framework of the World Bank project RPED ('Regional Program on Enterprise Development in Africa). The data base includes 185 manufacturing firms for which historical data on sales, employment and other structural variables are available. The firms are active in one of the four main industrial sectors: agro-industries, textiles, wood working and metal working. Both formal and informal sector firms are included.

In line with other studies (McPherson and Liedholm, 1996; Mead and Morrisson, 1996) firms are defined as 'formal' if they are registered, fulfil all tax obligations and respect labour and other regulations. Following this definition, the formal firms were selected from the population of firms which submit records yearly with the 'Banque de Données Financières' (BDF). These firms respect all fiscal obligations, including VAT, company taxes and business license taxes at local and national level. They have full access to all business support services organised by state agencies.

The group of informal firms on the other hand pay at most local business license tax (*'patente'*). Many informal firms in Côte d'Ivoire are registered merely for local tax purposes, a consequence of the government objective to extend the tax base by including the informal sector (World Bank, 1994). Despite this local tax contribution, they keep the image of being tax evadors, as some informal firms engaged in activities which require no fixed premises still escape the tax burden and all of them escape company and value added taxes. None of the informal firms have access to business support services and training programs. A third and relatively small group of firms defines itself as semi-formal. The firms don't keep full records but nevertheless pay some taxes on turnover. They have access to a number of support services provided by state agencies, but are in size and technology closer to the informal sector firms.

Most industrial activity is located in the industrial core region of Abidjan. A majority of the sample firms is also located there. The second largest industrial region is at the more inward located city of Bouaké followed by the industrial region in the surroundings of the seaport of San Pedro. Industrial activity is relatively weak and constant in the rest of the country.

Foreign participation in industry is very important in Côte d'Ivoire as a result of former open-door policies which were aimed at stimulating foreign investment and attracting

labour. Over the period 1980-91 foreign ownership accounted for an average of 78% of total equity of private firms reporting to the BDF (World Bank, 1994). The extensive foreign ownership and the large presence of foreigners in the labour force also characterise the sample firms. Firms owned by non-African foreigners are on average larger. Firms owned by foreigners from neighbouring West-African countries are mainly micro-enterprises and small firms and they are all active in the informal sector.

Table 1: Composition of the sample and size of the firms in terms of employment in 1995

	Number of firms	Average size	Standard deviation
All firms	185	144.4	433.3
By start-up year			
1918-69	35	327.4	341.3
1970-79	45	265.7	784.8
1980-86	48	47.1	74.2
1987-95	57	18.3	21.9
By sector			
Agro-industries	48	227.6	705.4
Textiles	45	153.0	424.3
Wood working	46	130.9	226.1
Metal working	46	62.8	79.1
By formal status			
Formal	125	210.4	514.7
Semi-formal	22	12.2	18.7
Informal	38	3.8	4.6

6. Empirical model

In line with previous work (Evans, 1987a) the basic empirical model follows a general growth function g in size and age :

$$g = \frac{S_{t'}}{S_t} = g(S_t, A_{t'}) \qquad (1)$$

where $S_{t'}$ and S_t are the size of a firm in period t' and in period t respectively and $A_{t'}$ is the age of the firm in period t'. Following the arguments proposed in section 4 and besides their implicit effects on the shape of the growth function, this functional relationship is further moderated through a set of environmental and firm specific variables X which are hypothesized to interact with the basic function in the following exponential way:

$$G = g(S_t, A_{t'})e^{bX} \qquad (2)$$

Approximating the growth function g through a second order logarithmic expansion of a generalised function relating growth to size and age, the estimating equation corresponds to the following form:

$$\frac{\log(S_{t'}) - \log(S_t)}{d} = a_0 + a_1 \log(S_t) + a_2\left[\log(S_t)\right]^2 + a_3 \log(A_{t'}) + a_4\left[\log(A_{t'})\right]^2 + a_5 \log(S_t) * \log(A_{t'}) + \sum_{i=1}^{n} b_i X_i \quad (3)$$

where d stands for the number of years over which growth is measured and a and b are coefficient vectors.

The dependent variable in equation 3 corresponds to an average annual growth rate. The relationship between firm growth and size and between firm growth and age can subsequently be analysed by calculating the respective partial derivatives (Evans, 1987a and 1987b; Variyam and Kraybill, 1992). The partial derivatives g_s=(dlnG/dlnS) and g_a=(dlnG/dlnA) allow to test for alternative theories of firm growth, including the non-monotonic growth path suggested by the integrated approach developed in section 4. Gibrat's law implies that the partial derivative g_s equals zero. Alternatively a negative relationship between firm size and growth implies that $g_s<0$. Models of learning suggest that $g_a<0$. The elasticity of end-of-period size with respect to beginning-of-period size is $E_S=1+dg_s$, while the elasticity of end-of-period size with respect to age is $E_A=dg_a$.

Variables

The dependent variable is the average annual growth rate of sales and, alternatively, of the firm's employment growth calculated over the entire period of existence of the firm, from birth to 1994. The analysis is also performed analysing growth over a homogenous shorter period, covering the years from 1989 until 1994.

Following the proposed estimating equation, the set of explanatory variables includes firm size (SIZE), measured alternatively as deflated sales or employment, and firm age (AGE) as basic determinants of firm growth. Size is measured at the beginning of the period under consideration, start-up and 1989 respectively. , while age is measured in 1994.

The environmental moderators of the growth relationship include the sector to which the firm belongs and the region where it is located. Three binary variables account for possible different growth performance in the textiles, woodworking and metalworking industries (TEXTILES, WOOD, METAL). The reference sector is agro-industry. From interviews it is clear that owners and managers view the geographical location as important for having access to local resources. The availability of industrial sites and infrastructure and access to raw materials and skilled labor were mentioned as the main location determinant by 80% of the firms. Only 8% of all firms choose their location with the intention to be close to clients or competitors. The largest market and the largest supply of resources is in Abidjan. Firms located in Abidjan are further more likely to engage in networking and subcontracting, hereby exploiting additional growth opportunities. Three binary variables (BOUAKE, SAN PEDRO, OTHER REGIONS) are included to capture the geographical niche effect of being located in Bouaké, San Pedro or other regions in the country, as compared to the reference group of firms being located in Abidjan.

In addition to the regional impact on diffuse competition, a firm specific measure of capital, or more precisely, non-labour resource-intensity is included to capture the extent to

which firms have access to the entire resource space, including capital and basic services (CAPITAL INTENSITY). Firms which are to some extent deprived from these inputs are expected to grow less. Large established firms keep the smaller labour intensive firms from growing further after they have reached a critical size. Above this size other more capital intensive firms outperform them as the use of capital allows for more efficient production. Capital intensity is measured as the cost of electricity, water, fuel and telephone per employee. In the employment growth regression the share of the cost of electricity, water, fuel and telephone in total sales is used as an alternative to measure these costs per employee to minimise spurious correlation. Capital and technology sourcing from abroad is taken into account by making a distinction following the origin of capital: non-Ivorian African, European or Asian direct investment (AFRICAN, EUROPEAN, ASIAN). Foreign firms in Côte d'Ivoire are indeed found to import significantly more than their domestic counterparts (Harrisson, 1996). A further distinction is made for subsidiaries of firms, which have access to resources of the parent company and its network (MULTI). Similarly a binary variable SOE denotes State Owned Firms, which have a soft budget constraint and have access to bank loans under state guarantee. Their status moreover facilitates the relationship of SOEs with other market participants. The legal status implies more clear-cut juridical consequences, facilitating contract enforcement and granting them more credibility, transparency or legitimation in the industry.

In order to take further account of the firm's legitimation in the industry, a binary variable FORMAL is included. The variable takes the value one for the formal firms, which are officially registered, fulfil all legal and tax obligation and takes the value zero for informal firms, including the so-called semi-formal firms.

Estimation and results

The model is estimated with a two stage least squares where the fitted values of a probit equation, explaining the probability that a firm is formally registered, are entered into the growth equation (Barnow et.al, 1981). This procedure is adopted to account for the possible bias originating from endogeneity of the variable FORMAL. The decision to become formal appears indeed to be subject to the same underlying growth process. In instrumenting the variable FORMAL a binary variable equalling one for exporting firms was used as an extra variable. Standard errors are estimated using White's consistent estimator (White, 1981). It should also be noted that only surviving firms are included in the data set, implying that the findings of the empirical analysis are restricted to survivors. A recent study by McPherson (1996) on the growth of firms in five southern African countries analyses the possible selection bias resulting from the exclusion of exiting firms on the growth relationship and finds this bias to be insignificant.

Table 2 shows the estimated coefficients and t-ratios for the growth regressions. The first four columns presents the results for sales growth. The last four columns present the employment growth regressions over the two different periods, start-up until 1994 and from 1989 until 1994.

The relationship between size and growth is significantly negative, implying that smaller firms grow faster than larger ones. The results are robust and hold over the different

periods and samples of firms for which growth is measured[4]. They are consistent with studies conducted in other countries. For sales growth over the last five years the quadratic term of size is positive and significant at the 95% level implying that the negative effect of size on growth diminishes for larger size classes. The partial derivatives of the growth rate to log size evaluated at the sample mean are negative. They equal -0.10 for the growth regression from start-up until 1994 and -0.07 for growth over the period 1989-94. The elasticity of end-of-period size with respect to beginning-of-period size is -0.28 for the sales growth regression over the entire period and 0.67 for the period 1989-94, results which go against Gibrat's law of random growth behaviour.

In estimating the age effect, the restriction of fixing the coefficient of squared employment to zero could not be rejected. Hence, the extra columns presenting the restricted model table 2. For small firms the effect of age on growth is negative. However, from a certain critical size on, the age effect becomes positive as is suggested by the positive and significant interaction term between size and age. Evaluated at the sample means, the partial derivative of growth to log age equals 0.008 for the sales growth equation over the period from start-up until 1994 and -0.007 over the period 1989-94. These findings, in particular those relating to the period since start-up, suggest that start-up size has an important effect on the subsequent growth performance of firms. Firms starting at a larger size tend to grow faster, as they grow older. This suggests that, in addition to learning effects, opposing processes are at work, which favour firms that start at a large scale. More precisely, the findings are supportive for the hypothesis that a dynamic process of diffuse competition and legitimation in the industry is putting firms under different regimes, with larger firms facing better growth opportunities as they become better legitimised over time and get access to more resources.

Corroborating these findings, capital intensive firms, i.e. firms with more intensive use of electricity, fuel, water and telephone, can grow significantly faster. Although small labour intensive firms realise strong growth rates in the beginning stages of their growth path, the growth smoothens very rapidly towards stagnating levels as the labour intensive firms reach the critical size at which economies of scale are fully exploited. Firms that are able to apply a more capital intensive technology and use related services more intensively can reap additional scale economies and grow further into a larger size.

[4] Historical sales and employment data were not consistently available for all firms. In order to use the maximum information available from the data set the size of the sample may therefore differ across estimating models. Running the different models on different subsamples and on the reduced sample of firms for which all information about employment and sales growth was consistently available, did not produce any different results.

Table 2.: Regression results for sales and employment growth over the period start-up-'94 and 1989-'94

	Sales growth				Employment growth			
	start-94	start-94	1989-1994	1989-1994	start-1994	start-94	1989-1994	1989-1994
AGE	0.007	-1.114 *	0.006	-0.113 **	-0.261 **	-0.164 ***	-0.198	-0.151 ***
	(0.076)	(-1.745)	(0.088)	(-2.127)	(-1.988)	(-3.322)	(-1.644)	(-3.137)
AGE²	-0.038 **	-	-0.040 ***	-	0.030	-	0.017	-
	(-2.010)		(-2.717)		(0.969)		(0.552)	
SIZE	-0.203 ***	-0.205 ***	-0.228 ***	-0.214 ***	-0.250 ***	-0.260 ***	-0.204 ***	-0.217 ***
	(-4.195)	(-4.214)	(-5.740)	(-5.160)	(-3.437)	(-3.917)	(-2.792)	(-3.662)
SIZE²	0.002	0.003	0.006 **	0.007 **	0.011	0.010	0.011 *	0.010 *
	(0.579)	(0.656)	(2.012)	(2.344)	(1.567)	(1.428)	(1.944)	(1.670)
AGE*SIZE	0.039 ***	0.036 ***	0.036 ***	0.025 **	0.038 *	0.046 ***	0.025	0.033 ***
	(2.977)	(2.666)	(3.510)	(2.504)	(1.958)	(2.871)	(1.391)	(3.367)
CAPITAL INTENSITY	0.021 ***	0.022 ***	0.023 ***	0.022 ***	0.232 ***	0.246 ***	0.190 **	0.203 **
	(2.687)	(2.771)	(2.834)	(2.633)	(2.638)	(2.922)	(2.184)	(2.565)
FORMAL	0.384 ***	0.416 ***	0.545 ***	0.546 ***	0.512 ***	0.496 ***	0.405 ***	0.408 ***
	(2.666)	(2.812)	(4.426)	(4.197)	(3.302)	(3.251)	(2.984)	(2.974)
SAN PEDRO	-0.266 ***	-0.267 ***	-0.107	-0.105	-0.113	-0.115	-0.001	-0.004
	(-2.717)	(-3.342)	(-0.867)	(-0.882)	(-1.447)	(-1.367)	(-0.017)	(-0.048)
BOUAKE	-0.169 **	-0.174 **	-0.183 ***	-0.182 ***	-0.175 **	-0.165 *	-0.185 ***	-0.188 ***
	(-2.005)	(-2.037)	(-3.006)	(-2.882)	(-2.022)	(-1.850)	(-3.014)	(-2.975)
OTHER REGIONS	-0.124	-0.155 *	-0.237 ***	-0.240 ***	-0.131 **	-0.117	-0.125 **	-0.129 **
	(-1.292)	(-1.899)	(-3.756)	(-4.249)	(-1.974)	(-1.610)	(-2.388)	(-2.387)
AFRICAN	0.053	0.013	0.103	0.067	0.081	0.098	0.152 *	0.162 *
	(0.686)	(0.165)	(1.141)	(0.764)	(1.114)	(1.196)	(1.871)	(1.742)
EUROPEAN	-0.001	-0.043	0.044	0.021	-0.050	-0.020	0.003	0.011
	(-0.012)	(-0.662)	(0.784)	(0.365)	(-0.705)	(-0.328)	(0.063)	(0.217)
ASIAN	0.001	-0.024	0.024	0.020	-0.150 *	-0.137	-0.083	-0.081
	(0.000)	(-0.287)	(0.318)	(0.266)	(-1.686)	(-1.607)	(-1.393)	(-1.359)
SOE	0.142	0.088	0.168	0.147	-0.082	-0.064	-0.061	-0.058
	(1.047)	(0.624)	(1.208)	(1.054)	(-0.398)	(-0.326)	(-0.758)	(-0.722)
MULTI	0.029	0.025	-0.082	-0.075	0.033	0.038	0.026	0.023
	(0.427)	(0.337)	(-1.211)	(-1.065)	(0.902)	(0.996)	(0.688)	(0.653)
TEXTILES	0.013	-0.012	-0.051	-0.070	0.172 **	0.178 **	0.096	0.099
	(0.128)	(-0.121)	(-0.745)	(-0.978)	(2.127)	(2.051)	(1.494)	(1.450)
WOOD	0.117	0.138 *	0.059	0.074	0.080	0.062	0.023	0.016
	(1.524)	(1.768)	(1.000)	(1.208)	(1.349)	(1.065)	(0.497)	(0.329)
METAL	0.111	0.090	-0.002	-0.014	0.035	0.043	0.050	0.053
	(1.354)	(1.075)	(-0.049)	(-0.267)	(0.755)	(0.984)	(1.342)	(1.465)
Constant	0.370	0.453 **	0.326 *	0.382 **	0.377 **	0.320 **	0.334 **	0.312 **
	(1.584)	(2.006)	(1.754)	(1.981)	(2.444)	(2.332)	(2.476)	(2.468)
N	66	66	107	107	107	107	129	129
R-Adj.	0.4284	0.4208	0.3800	0.3579	0.3579	0.3545	0.4007	0.4014
F-statistic	3.707	3.778	4.609	4.476	4.282	4.424	5.755	6.048

Asymptotic t-ratios are in parentheses; Significance levels: * 99%; ** 95%; * 90%.**

In general, the hypothesis that the growth is strongly moderated through different environmental and institutional conditions is strongly supported by the data. The coefficient of the variable formal is positive and significant at the 99% level. The formal character of a firm increases its estimated annual growth rate over the entire period since start-up by 0.38. For the period 1989-1994 the formal status increases the expected annual growth rate with 0.55. The results suggest that besides competition, the process of formal legitimation is important. Formal firms tend to grow faster as scarce resources are allocated to established firms which have legitimated themselves in markets characterised by high transaction costs.

Also the geographical niche seems to have an impact on the development of firms. The location variables all have a negative coefficient indicating that the better supplied Abidjan region is more conductive to firm development than the geographical niches of Bouaké, San Pedro and other locations. External scale economies and urbanisation economies relaxing diffuse competition for resources seem to account for these differences in growth performances.

The presumed effects of foreign ownership, offering firms the opportunity of sourcing abroad, are not significant. State owned firms (SOE) tend to expand sales faster. However, the estimated standard error is large. This also applies to firms belonging to a larger holding group (MULTI). Sectoral effects also do not seem to produce clear variations in the growth performance of firms.

The estimation of the employment growth equation produces results very comparable to the sales growth results. The negative age-growth and size-growth relationship seems robust. The interaction term is again positive and significant. Evaluated at the sample means, the partial derivatives of growth to log size and log age are all negative equalling -0.11 and -0.03 respectively for the entire period since start-up and -0.07 and -0.03 for the five year growth period. Again, for firms which start at a large scale, i.e. about 30 employees or more, the age effects turns positive. Firms located in Abidjan expand employment at a higher average growth rate. The difference with firms located in Bouaké and other regions remains significant. Formal firm and capital intensive firms grow significantly faster by 0.51 and 0.41 percent respectively. Except for the textiles sector, sectoral effects again do not seem to matter much.

The empirical results suggest a strong difference in the growth performance for firms which start at a small scale and use labour intensive technologies. If resource markets, including primarily capital markets, were to operate without imperfections, the transition towards a more capital intensive technology would be a continuous process. However, serious asymmetries in information operate in favour of the larger established firms benefiting from reputation effects and work against the smaller firms with a labour intensive technology. As a consequence firms in the middle of the size distribution may be assumed to face the most severe obstacles to growth. The following section aims at uncovering more of these growth barriers through analysing the obstacles to growth as they are perceived by the owners and managers of the firms.

7. Obstacles to growth: the owner's and manager's perceptions

In the RPED survey the interviewed person, manager or owner of the firm, was asked to quantify a list of 17 factors on the degree to which they actually constitute an obstacle to the growth of their firm. The answers to the question were the respondents' subjective and personal view. The questions were intended to know the sources of obstacles to growth at the moment the interview took place in 1995 and these are not necessarily identical to past growth hindrances. Nevertheless, it may be assumed that the main constraints to growth are not too variable over time. The analysis of the manager's perception complements the findings of the previous section and contributes to a better understanding of how certain types of growth obstacles are related to firm characteristics.

Table A.1 in appendix shows the list of growth hampering factors. The respondents quantified the severeness of these factors on a numeric scale ranging from 1 to 5, where 1 = no obstacle and 5 = severe obstacle. The average response value and standard deviation is shown in the table. It can be seen that a lack of credit is perceived as the most constraining factor, followed by taxes and lack of demand and business support services. The 17 factors are regrouped and clustered into four compound variables reflecting four different types of obstacles:

Regulation on: social capital, activities and location, labor regulations, price and foreign exchange controls, taxes, problems obtaining licenses and investment benefits and corruption.

Market conditions: lack of demand and competition of imports.

Infrastructure: lack of infrastructure and business support services and the prices of public utilities.

Credit: lack of credit.

Each compound variable corresponds to the average of the composing variables and ranges from one to five. In order to uncover systematic effects, a two-way censored tobit model relates the height of the growth obstacle to the following vector of explanatory variables:

- four binary variables classifying firms in four different size classes: MICRO (1-4), SMALL (5-49), MEDIUM (50-99), LARGE (100-249). The reference group are very large firms (over 250 employees).
- the age of the firm in 1995 (FIRM AGE).
- three sectoral variables (TEXTILES, WOOD, METAL), the reference group being firms active in agro-industries.
- a binary variable equal to one for exporting firms (EXPORTING).
- three locational variables (BOUAKE, SAN PEDRO, OTHER REGIONS), the reference group being firms located in Abidjan.
- three binary variables related to the origin of the equity capital (EUROPEAN, AFRICAN, ASIAN). They equal one if the majority equity capital (>50%) is owned by foreign Africans, Europeans or Asians respectively. The reference group are firms which are for 50% or more Ivorian owned.
- a binary variable (INFORMAL) for firms operating in the informal and semi-formal sector.

The estimation results are shown in table 3.

Table 3. Tobit estimates of perceived obstacles to growth

Dep. Var:	Regulations	Market conditions	Infrastructure	Financial constraints
constant	1.466 ***	1.911 ***	0.994 **	0.569
	(53.965)	(15.932)	(4.791)	(0.090)
D-MICRO	-0.085	-0.580	0.403	2.553
	(0.150)	(1.228)	(0.675)	(1.588)
D-SMALL	0.017	-0.437	0.660 *	2.808 *
	(0.012)	(1.285)	(3.201)	(3.241)
D-MEDIUM	0.176	-0.496	0.825 **	3.956 **
	(1.070)	(1.451)	(4.523)	(5.673)
D-LARGE	0.171	-0.042	0.309	2.825 *
	(0.961)	(0.010)	(0.579)	(2.831)
FIRM AGE	0.002	0.011	0.007	0.031
	(0.283)	(1.292)	(0.565)	(0.637)
INFORMAL	-0.315 *	-0.017	-0.449	-1.037
	(3.703)	(0.002)	(1.628)	(0.484)
SAN PEDRO	0.126	-0.928	1.163 **	-2.164
	(0.287)	(1.480)	(5.434)	(0.961)
BOUAKE	-0.233	-0.402	-0.632	-2.706
	(1.671)	(0.862)	(2.292)	(2.418)
OTHER	-0.502 *	-0.740	-0.044	2.444
REGIONS	(3.456)	(1.292)	(0.007)	(0.933)
AFRICAN	0.106	0.335	0.229	1.195
	(0.509)	(0.857)	(0.508)	(0.778)
EUROPEAN	0.003	0.226	-0.221	-1.640
	(0.001)	(0.595)	(0.070)	(2.127)
ASIAN	-0.072	0.452	-0.064	-1.951
	(0.195)	(1.345)	(0.032)	(1.633)
TEXTILES	-0.030	-0.091	0.191	-0.590
	(0.047)	(0.080)	(0.408)	(0.221)
WOOD	-0.090	-1.059 ***	0.049	-0.784
	(0.402)	(8.911)	(0.025)	(0.368)
METAL	-0.197	-0.582 *	-0.426	-0.788
	(2.497)	(3.808)	(2.350)	(0.477)
EXPORTING	-0.069	-0.266	-0.114	-0.280
	(0.423)	(1.079)	(0.230)	(0.080)
Sigma	0.519 ***	1.201 ***	1.108 ***	4.392
	(214.318)	(158.566)	(167.040)	(74.732)
N	179	179	179	179
Log likelihood	-143.1	-213.1	-214.5	-216.6

X^2 -ratios are in parentheses; Significance levels: * 99%; ** 95%; * 90%.**

As could be expected, formal firms are more subject to regulatory constraints than semiformal and informal firm. Regulation is less an obstacle to growth for firms in the metal working sector and for firms located outside the industrial core regions.

The perception of market conditions as an obstacle to growth is related to the sector of activity. Firms in woodworking and in metal working report significantly less a lack of demand or intense competition from imports as an obstacle to growth.

The perception of infrastructure and supporting services as a constraint to growth is related to size, sector and location. Corroborating the findings of the growth model and implied diffuse competition, medium sized firms followed by small firms consider infrastructure

and related services more than any other group as a growth obstacle. For the largest size class (250+) infrastructure is least a problem, probably because these firms have reached the critical size to develop their own substitute services whenever infrastructure proves unsatisfactory. It also appears that the largest firms enjoy a priority status with government officials when it comes to the provision and distribution of well functioning infrastructure and utilities. Firms in the metal working sector experience less hindrance from infrastructure. The opposite holds for firms in San Pedro.

A lack of credit seems again least constraining to the largest firms (250+) while, similar to infrastructure, most constraining to medium sized firms. Small and large firms are in a similar way affected by the credit constraint which these firms experience as significantly more severe than do very large firms. Foreign African firms experience credit as more growth constraining than do their local counterparts. Asian and European firms on the other hand feel less constrained by credit than the local Ivorian firms.

In sum, the results with respect to the perceived obstacles to growth provide interesting corroborating evidence for the theoretical framework and empirical growth model presented in this paper. The constraining factors with respect to infrastructure and supporting services and the lack of credit are at the heart of the underlying asymmetric growth processes observed for the different groups of firms in developing countries.

8. Conclusion

This paper presents empirical support for the proposition that the bimodal size structure of manufacturing firms, observed in many African countries is the result of a complex process in which institutional and structural factors interact with dynamic learning processes of firms. The model formalizing these processes is tested against data on manufacturing firms in Côte d'Ivoire. The observed negative relationship between a firm's growth and its age and size is consistent with efficiency maximisation through learning which effects are stronger for younger firms, and through scale enlargements which effects diminish as the firms expands. Interestingly, firms which start at a large scale appear to benefit from a different regime with a stronger growth performance as they grow older, suggesting that other mechanisms are at work. In line with the theoretical reasoning developed in this paper, the difference in regime is consistent with the mechanism of diffuse competion and legitimation, dynamic processes emphasized in organizational ecology models.

Under the process of diffuse competition, firms compete heavily for scarce resources. Resources are not primarily allocated to the most efficient firms, as one can normally expect from a process of intense competition in well-functioning markets, but especially to those firms who are legitimated in the industry. The process of legitimation is important in the African context as transaction and information costs are very high in poorly developed markets with relatively few market participants and little transparency as to a firms' activities, performance and strengths. A firm can further legitimate its existence by acquiring the formal status through officially registering itself. In spite of the tax burden and the many regulatory constraints formal firms are subject to, the formal status gives a firm the opportunity to advertise itself and develop a solid reputation in the business

environment. The record keeping obligations which are imposed to the formal firms decrease the transaction and information costs which are to be overcome when dealing with any firm. As such, contracting for resources and growth is facilitated by the formal status of the firms.

Driven by the process of diffuse competition firms also tend to specialise in certain market niches. Some 80% of all sample firms choose their location in function of access land, infrastructure, skilled labour and raw materials. This indicates that some resources are actually location related and supports the choice of geographical niche boundaries for the analysis of firm growth. The residence of a firm in a geographical niche is indeed found to determine a firm's growth performance. Firms in the industrial core region of Abidjan tend grow faster than firms located in the rest of the country.

Alternatively the firms reside in niches determined by their size and production technology. Firms which are denied access to capital and infrastructure are forced to specialise in labour intensive production procedures. These techniques hardly generate economies of scale. Smaller labour intensive firms thus enter, after a period of fast growth, a phase of stagnation in terms of employment growth. Replication and splitting up of the firm often occurs in this case. Firms with access to the entire resource space and a capital intensive production technique are able to exploit existing economies of scale and to grow into an even larger size.

The combination of these forces imply that firms which start at a small scale are quickly confronted with major growth obstacles. The findings from the empirical growth model are corroborated with results from a survey on growth obstacles as they are perceived by managers and owners of firms. Managers of medium sized firms experience the regulatory environment as constraining, and complain significantly more about infrastructure and credit constraints than do manager of the largest firms.

In uncovering the asymmetric growth processes for different groups of firms in developing countries, the paper invites further analysis with respect to those factors which can help firms to transition to better performing groups. There can be little doubt that such an analysis will prove to be very useful for policy makers who may use these insights to make aid and other development instruments more effective and efficient in the future.

References

Barnow, B., Cain, G., Goldberger, A. (1981), Issues in the analysis of selection bias, University of Wisconsin, Department of Economics.

Biggs, T. S., Oppenheim, J. (1986), What drives the size distribution of firms in developing countries?, Employment and enterprise policy analysis discussion paper n° 6, (HIID, Cambridge, MA).

Boone, C., van Witteloostuijn, A. (1994), Industrial organisation and organizational ecology, the potentials for cross-fertilization, Organization Studies, 14.

Das, S., (1995), Size, age and firm growth in an infant industry: The computer hardware industry in India, International Journal of Industrial Organisation, 13, 111-126.

Debackere, K., Clarysse, B. (1997), Towards an ecological understanding of firm founding and growth in emergent populations, Katholieke Universiteit Leuven, Onderzoeksrapport nr. 9715, 60 p.

Dunne, P., Hughes, A., (1994), Age, size, growth and survival: UK companies in the 1980s, The Journal of Industrial Economics, 42, pp. 115-140.

Dunne, T., Roberts, M. J., Samuelson, L., (1989), The growth and failure of US manufacturing plants, Quarterly Journal of Economics, 104, pp. 671-698.

Evans, D. E. (1987a), The relationship between firm growth, size and age: estimates for 100 manufacturing industries, The Journal of Industrial Economics, 35, pp. 567-582.

Evans, D. E. (1987b), Tests of alternative theories of firm growth, Journal of Political Economy, 95, pp. 657-674.

Gibrat, R. (1931), Les inégalités économiques, Paris, Sirey.

Hannan, M.T., Carroll, G.R. (1992), Dynamics of organizational populations; Density, Legitimation and Competition, Oxford University Press, New York.

Hannan, M.T., Ranger-Moore, J., Banaszak-Holl, J. (1990), Competition and the evolution of organizational size distributions, in:Singh, J. (ed.), Organisational Evolution: New Directions, Sage, Newbury Park, CA., p. 246-268.

Harrison, A. (1996), Determinants and effects of foreign direct investment, in: Roberts, M. J., Tybout, J. R. (1996), Industrial evolution in developing countries, Micro patterns of turnover, productivity and market structure, Oxford University Press, 345p.

Ijiri, Y. and Simon, H. A. (1964), Business firm growth and size, The American Economic Review, 54, pp. 77-89.

Jovanovic, B. (1982), Selection and the evolution of industry, Econometrica, 50, pp. 649-670.

Klepper, S., Graddy, E. (1990), The evolution of new industries and the determinants of market structure, Rand Journal of Economics, 21, 27-44.

Kumar, M. S. (1985), Growth, acquisition activity and firm size: evidence from the United Kingdom, The Journal of Industrial Economics, 33, pp. 327-338.

Lucas, R. E. (1978), On the size distribution of business firms, The Bell Journal of Economics, 9, pp. 508-523.

Mansfield, E. (1962), Entry, Gibrat's Law, innovation and the growth of firms, The American Economic Review, 52, pp. 1023-1051.

McPherson, M. A. (1996), Growth of micro and small enterprises in southern Africa, Journal of Development Economics, 48, pp. 253-277.

McPherson, M. A., Liedholm, C. (1996), Determinants of small and micro enterprise registration: results from surveys in Niger and Swaziland, World Development, 24, pp. 481-487.

Mead, D. C., Morrisson, C. (1996), The informal sector elephant, World Development, 24, pp. 1611-1619.

Nugent, J.B. (1996), What explains the trend reversal in the size distribution of Korean manufacturing establishments?, Journal of Development Economics, 48, pp. 225-251.

Nugent, J. B., Nabli, M. K. (1989), An institutional analysis of the size distribution of manufacturing establishments: an international cross-section study, CES International Economics Research Paper n°62, 29 p.

Nugent, J. B., Nabli, M. K. (1992), Development of financial markets and the size distribution of manufacturing establishments: International comparisons, World Development, 20, pp. 1489-1499.

Pakes, A., Ericson, R., (1990), Empirical implications of alternative models of firm dynamics, Columbia University Working Paper.

Roberts, M. J., Tybout, J. R. (1996), Industrial evolution in developing countries, Micro patterns of turnover, productivity and market structure, Oxford University Press, 345p.

Variyam, J.N., Kraybill, D.S., (1992), Empirical evidence on determinants of firm growth, Economics Letters, 38, pp. 31-36.

White, H. (1980), A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity, Econometica, 48, 817-832.

Winter, S.G. (1990), Survival, selection and inheritance in evolutionary theories of organisation, in:Singh, J. (ed.), Organisational Evolution: New Directions, Sage, Newbury Park, CA., p. 269-297.

World Bank (1994), Republic of Côte d'Ivoire, Private sector assessment, Report n° 12885-IVC, Washington, D.C., 96p.

Table A.2.1. : Obstacles to growth, the perception of the owners or managers

Obstacle:	mean *	std.
1. Lack of credit	2.67	1.68
2. Taxes	2.45	1.49
3. Lack of demand	2.16	1.48
4. Lack of business support services	2.15	1.45
5. Problems obtaining investment benefits	1.83	1.40
6. Corruption	1.82	1.42
7. Price public services	1.56	0.94
8. Competition of illegal imports	1.62	1.27
9. Lack of infrastructure	1.35	0.94
10. Competition of legal imports	1.32	0.98
11. Regulations on activities	1.32	0.90
12. Labor regulations	1.28	0.72
13. Price controls	1.13	0.57
14. Problems obtaining licenses	1.13	0.62
15. Regulation on equity capital	1.11	0.63
16. Regulation on location	1.11	0.58
17. Foreign exchange controls	1.04	0.27
Compound variables:		
Credit	2.67	1.68
Infrastructure	1.69	0.76
Market conditions	1.70	0.81
Regulation	1.42	0.42

N=179

*** Mean values can range from 1 (no obstacle) to 5 (severe obstacle).**